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AUTHOR van Batenburg, Theo A.; Lokman, Ineke H.
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ABSTRACT

Research was conducted in the Netherlands to determine what variables at the school level contribute to the differences in school effectiveness in the senior secondary vocational education system. Information was gathered through questionnaires answered by a representative sample of 57 of the country's 276 senior vocational schools and through questionnaires and intelligence test results from 4,889 students. Students were asked about their age, motivation, and preceding education. Analyses using a logistic approach showed that some school characteristics have a small effect on the degree to which students pass on to the next school year. These variables include pupil tutoring, the quality of the educational situation, and school size. However, student motivation and intelligence play a larger role in school success than school characteristics. (KC)

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Effectiveness in senior secondary vocational education

paper to be presented at the ICSEI in Cardiff, January 1991

Theo A. van Batenburg
Ineke H. Lokman

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RION, Institute for Educational Research
University of Groningen
P.O. Box 1286
9701 BG Groningen
The Netherlands
tel. 050-636667(secr. 636631)
fax. 31-50-636670

abstract

The subject of this paper is the effectiveness of the senior secondary vocational education. A representative of each school filled in a questionnaire about the educational arrangements at school. The pupils filled in a questionnair as well and were tested on intelligence. They were asked about their age, motivation and preceding education. The (logistic) multi-level analyses show that some school characteristics have a small effect on the degree in which pupils pass on to the next schoolyear.

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Introduction

Research in senior secondary vocational education has not received much attention with respect to school effectiveness. This is rather strange because 42% (n=300.000) of the Dutch generation pupils take part in it. About 20% of these pupils are found in the senior secondary commercial section, 22% in the senior secondary technical section and 21% in the senior secondary personal and social services and health care section. The school effectiveness of these sections is the subject of this article. The pupils vary in age from 16 until about 20 years of age. To get an idea of the sort of professions these pupils are trained for some of the many obtainable professions will be summed up here. In the senior secondary commercial section pupils are trained to become a secretary, bookkeeper, salesman and so on; in the senior secondary technical section: electrician, clerk of works, draughtsman; in the senior secondary personal and social services and health care section: nurse, assistent to the doctor, cook in institutions. The senior secondary commercial section has a general first year. In the other two sections the pupils have already chosen for a specilization in a group of professions.

In this article we will try to contribute to the theory of school effectiveness by exploring effective school variables for the specific field of senior secondary vocational education.

The output of the senior secondary vocational education seems to be rather low. In the senior secondary commercial section about 13% of the pupils fail their first year and 24% have already dropped out of school during the first year. For the senior secondary technical section these percentages are 12 and 14, and for the senior secondary personal and social services and health care section 6 and 19. The effectiveness of the senior secondary commercial section is very low, the other sections seem to be somewhat more effective but their percentages are still not very outstanding. The above mentioned percentages may vary considerably between schools. For failing the first year we found in the senior secondary commercial section percentages varying between 7% and 27%, for drop out between 10% and 43%. In the senior secondary technical section these percentages vary for failing between 0% and 28%, for drop out between 6% and 29%. In the senior secondary personal and social services and health care section between 0% and 19% for failing and between 5% and 33% for drop out.

These variations in percentages are an indication for rather large differences in school effectiveness. The following research question will be explored: "which are the variables at the school level that contribute to the differences in school effectiveness in the senior secondary vocational education"?

Variables at the level of the school

Vocational education has a specific character. In comparison to forms of general education the major emphasis is on the preparation for a profession and to a lesser degree on general cognitive objectives. This is the reason why we have taken passing or not passing the first year as the effect criterion. It is expected that aspects of presenting the subject matter in modules, learning in practice, aspects of pupil tutoring and the attitude of the school towards educational reform have some relation with the criterion. Also the school-size will be taken into consideration.

These variables have been measured by means of a questionnaire filled in by the school administrator. The following concepts have been measured in item scales: history of educational reform in the periods 1982-1987 and 1987-1989; pupil tutoring; the educational process and the judgement about the quality of the educational situation. This item scales are reasonably reliable with Cronbachs' alpha's all above .65. For this article it takes too much space to present all items and the scale analyses. However to give an idea about the contents of the scales we present for each scale some examples of items. The two scales about the 'History of Educational Reform' (HER1&2) contain items like the following: which educational reform has been realized regarding "educational objectives", "presenting the subject-matter in modules", "the ways of learning in practice" and "examination". The scale named 'Pupil Tutoring' (PT) contains items like: " is there time available at school in which pupils with educational deficits get additional attention", "does social emotional tutoring exist at school", " is there time available at school in which pupils can make their homework and ask a teacher questions". The scale named 'Educational Process'(EP) contains items like: it is customary that "pupils work in groups", "choose their own topics for papers". In the scale 'Quality of the Educational Situation' (QES) the school administrator made a judgement about the quality of the school equipment, the quality of the subject-matter and the financial position of the school. The school-size and whether or not the groups are formed on basis of previous education are taken in consideration as well (grouping versus no grouping), with the exception of the senior secondary personal and social services and health care section where no grouping procedure exists.

Variables at the level of the pupil

School effects cannot be estimated without taking pupil variables into consideration. The intelligence of pupils has been tested in two subtests of the PSB (Horn, 1969). This test is relatively easy to administer within a short period of time. These subtests concern the non-verbal part of intelligence. The motivation of the pupils has been measured by means of an item scale (alpha= .80). This scale contains 15 items like: "it is important for me to obtain good results at school", "I always make my homework", "I think of myself as a motivated pupil". The pupils were

also asked about their previous education which can be 'Junior secondary vocational education' (JSVE), 'Junior general secondary education'(JGSE) and a remaining category of all kinds of courses (other).

Data and method

In the following table the data are presented.

Table 1: the data.

section	pupils	schools	total number of schools
senior secondary commercial education	3434	18	75
senior secondary technical	777	20	69
senior secondary personal and social services and health care education	678	19	132

Since the data are both on the level of the school and on the level of the pupil a multi-level model will be used to estimate the effects. This will be done with the computer program VARCL (Longford, 1986). In this multi-level model the logistic option (binomial distribution) has been chosen (Longford, 1988; Goldstein, 1987). This is a suitable way of treating dichotomous dependent variables. All analyses will be done seperately for each section.

At first an empty model will be estimated to get an impression of the amount of variance at the level of the pupil and at the level of the school. Secondly all variables at the level of the pupils will be modelled to find the relative importance of the variables. In the third place only significant pupil variables will be modelled. In the fourth place all variables at the school level will be modelled together with the significant pupil variables. In the fifth place only significant pupil and school variables will be modelled. In the sixth place the pupil variables within the schools will be considered as having random effects (i.e. effects varying over schools) to explore within-group heterogeneity. All these models will be evaluated with regard to their differences in model fit.

The three sections of vocational education have their own character, their curriculum is completely different. That is the reason why we will model the variables within the sections. An other possible approach is an overall modelling procedure in which the section is a dummy variable. This procedure is less valid and more difficult to interpret because all interaction terms with the dummy variable must be explained. In this procedure effects within small sections are overruled by a non effect in a larger section.

Before we started the modelling procedure all variables have been transformed into z-scores within sections. This was done in order to be able to compare effect sizes. A larger value

indicates a larger effect size. However, in the binomial distribution these effect sizes cannot be directly transformed into the probability of passing or not passing the year. These probabilities depend on the baseline value (the value for a zero effect size) of the probability function. The same effect size will add more to the probability when the value is .5 than when it is .9. In diagram 1 this will be made clear.

Diagram 1: effect size and probability of passing the year

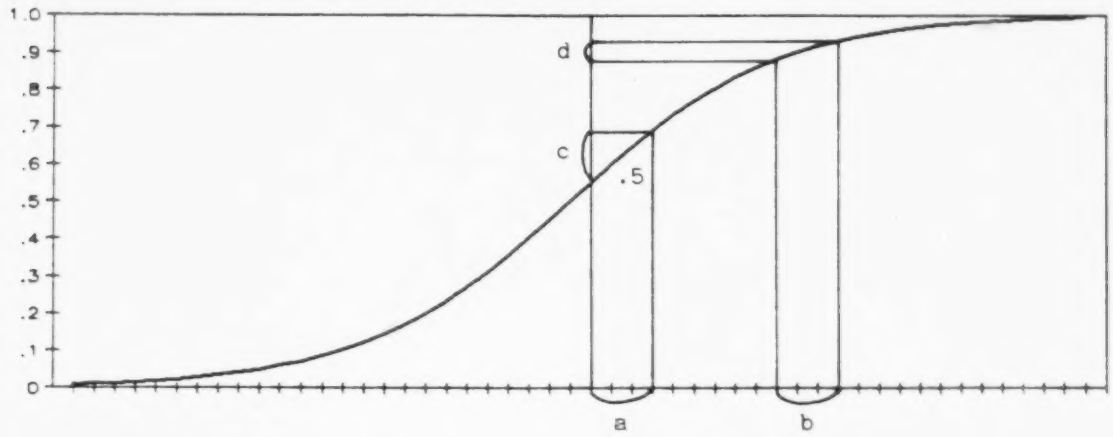

Diagram 1 shows the case where there are equal effect sizes and different probabilities of passing on to the next year differs (a=b;c>d).

Results

As was mentioned before a stepwise modelling procedure has been be used:

- model 1 : the empty model
- model 2 : all variables at the level of the pupil are included
- model 3 : only significant pupil variables are modelled
- model 4 : all school variables are included in model 3, together with the significant pupil variables
- model 5 : only significant school and pupil variables will be included. This model will be presented only if significant effect of school variables are found.
- model 6 : the significant pupil variables will be modelled as variables with random effects in order to explore within-group heterogeneity. This last model will be presented only if such random effects are found.

In table 2 the results of the modelling procedure in the senior secondary commercial section are presented.

Table 2: models in senior secondary commercial education for passing or not passing the first year

	model1	model2	model3	model4
r.i.v.	.15	.11	.11	.07
deviance	4454	4339	4340	4339
PSB3		.11*	.13*	.13*
		(.04)#	(.04)	(.04)
PSB8		.04		
		(.04)		
AGE		-.24*	-.24*	-.24*
		(.04)	(.04)	(.04)
MOTIVATION		.15*	.15*	.15*
		(.04)	(.04)	(.04)
-JSVE		.00	.00	.00
		(.00)	(.00)	(.00)
-JGSE		.67*	.66*	.67*
		(.11)	(.11)	(.11)
-other		.96*	.96*	.97*
		(.20)	(.19)	(.19)
HER1				.33
				(.20)
HER2				-.38
				(.20)
PT				-.11
				(.08)
EP				.03
				(.09)
QES				-.03
				(.09)
school-size				.01
				(.09)
grouping				.00
				(.00)
no-grouping				.01
				(.18)

r.i.v.=random intercept variance
*=significant effect
#= standard error always between brackets

The grand mean on the level of the pupil equals 1.00. The variance to explain at the school level is calculated as follows: the random intercept variance * the probability for passing the year * (1 - the probability for passing the year) * 100%. The mean probability for passing the year is .63 in the senior secondary commercial section, so the variance to explain at the school level equals .15 * .63 * .37 * 100% = 3.4%. When the pupil variables are entered this percentage drops to 2.5%. Model 2 is a significant improvement to model 1. The difference in deviances is 115 with 6 degrees of freedom (chi squared= 12.6). Model 3 is the best model in wich only significant effects at the level of the pupils are included. The difference between the deviances of model 2 and

model 3 is not significant. The intelligence of the pupils (PSB3) and motivation has a small effect. It seems clear that older pupils more often fail the first year. Pupils with a previous junior secondary vocational education (JSVE) fail more often than pupils with a junior general secondary education (JGSE) and other previous education. The school variables in model 4 do not explain any of the variance.

In table 3 the results of the modelling procedure in the senior secondary technical section are presented.

Table 3: models in senior technical secondary vocational education.

	model1	model2	model3	model4	model5
r.i.v.	.23	.25	.24	.01	.04
deviance	949	937	946	925	929
PSB3		.08			
		(.09)#			
PSB8		.11			
		(.09)			
AGE		-.12			
		(.08)			
MOTIVATION		.17*	.15	.16*	.15
		(.08)	(.08)	(.08)	(.08)
-JSVE		.00			
		(.00)			
-JGSE		.12			
		(.18)			
-other		.43			
		(.37)			
HER1				.07	
				(.16)	
HER2				-.02	
				(.20)	
PT				.37*	.38*
				(.16)	(.10)
EP				-.20	
				(.14)	
QES				.27*	.19
				(.13)	(.11)
school-size				-.36*	-.37*
				(.15)	(.10)
grouping				.00	
				(.00)	
no-grouping				-.31	
				(.31)	

r.i.v.=random intercept variance
*=significant effect
#= standard error always between brackets

The empty model 1 shows us that the random intercept variance is .23 which means that by a mean probability for passing the year of .65, 5.2% of the variance might be explained by variables at the school level. When the pupil variables are entered in model 2 this percentage rises to 5.7%. However the difference between the deviances of model 1 and model 2 is not significant (chi squared =12.6 df=6). Only the motivation of pupils seems to have a slightly positive impact. When in model 4 the school variables are entered the random intercept variance drops to .01 wich means that these variables explain a large part of the variance between schools. The deviance of model 5 differs significantly of the deviance in model 1. Pupil tutoring (PT) and the quality of the educational situation (QES) have a positive effect. School-size has a negative effect, on larger senior secondary technical schools the pupils pass less often to the second year.

In table 4 the results of the modelling procedure in the senior secondary personal and social services and health care section are presented.

Table 4: models in senior secondary personal and social services and health care education.

	model1	model2	model3	model4
r.i.v.	.07	.03	.04	.02
deviance	762	717	718	711
PSB3		.32*	.28*	.27*
		(.10)#	(.09)	(.09)
PSB8		-.10		
		(.10)		
AGE		-.01		
		(.09)		
MOTIVATION		.52*	.52*	.51*
		(.10)	(.10)	(.10)
-JSVE		.00	.00	.00
		(.00)	(.00)	(.00)
-JGSE		.54*	.54*	.50*
		(.20)	(.20)	(.20)
-other		.59	.57	.53
		(.33)	(.32)	(.32)
HER1				-.29*
				(.14)
PT				.00
				(.12)
EP				-.21
				(.14)
school-size				.19
				(.13)

r.i.v.=random intercept variance
*=significant effect
#= standard error always between brackets

In the senior secondary personal and social services and health care section the mean probability for passing the year equals .75. The random intercept variance of model 1 is .07 which implies that only 1.3% of the variance can be explained with variables at the school level. When in model 2 the pupil variables are included the random intercept variance drops to .03. This indicates that the variables at the school level can not have a large effect. Model 4 is a significant improvement of the empty model (chi squared =12.6, df=6). The best model is model 3 because omitting non significant effects does not decrease the deviance much. Intelligent and motivated pupils with a junior general secondary education pass more often to the next year.

Discussion

By means of the logistic option of the VARCL-program we have tried to estimate effects of variables at the school level on passing or not passing the first year in the senior secondary vocational education. In the analysed models also effects of variables at the level of the pupil have been taken into consideration.

In the senior secondary commercial section and the senior secondary personal and social services and health care section there is not much variance to explain at the school level (3.4% and 1.3% respectively). In the senior secondary commercial section the school variables do not explain any variance at the school level, while in the senior secondary personal and social services and health care section only the history of educational reform has a small negative effect. In these sections mainly pupil variables like intelligence, age, previous education and motivation could explain whether or not pupils pass on to the second school-year.

In the senior secondary technical section the variance to explain at the school level is the highest (5.2%). Most of the variance could be explained by the school variables. Effects are found for pupil tutoring, the quality of the educational situation and school-size. At the pupil level only motivation has a small effect.

We can conclude that the amount of variance to explain at the school level is very small and that the effects of variables differ between sections. The small amount of variance to explain at the school level could result from the dichotomous dependent variable. The probability for passing the year varies between .63 and .75, while the amount of variance is maximal by a probability of .50 for passing the year (the variance of the probability for passing the year = the probability for passing * (1 - the probability for passing)).

Probably the differences between sections can be attribute to their selection policy. In the senior seconary technical section pupils are more intelligent and motivated than the pupils in the other sections. This made us believe that if pupils' intelligence and motivation are above a certain limit

these variables become less important and school variables become more important to explain whether or not pupils pass on.

References

Goldstein, H. (1987). Multilevel models in educational and social research. New York: Oxford University Press.

Horn, W. (1969). Prüfsystem für Schul- und Bildungsberatung. Handanweisung. Verlag für Psychologie. Dr. C.J. Hogrete, Göttingen.

Longford, N.T. (1986) VARCL- Interactive software for variance component analysis.

Longford, N.T (1988) A quasilikelihood adaption for variance component analysis. Reprint from the 1988 Proceedings of the section on Statistical Computing Section of the American Statistical Association.